

imagination. The surgeon to whom an ignorant crowd should impute cruelty would fail to serve the cause of humanity by the technical descriptions to them of the operations he is required to perform.

There are two great principles involved in the welfare of any applied science—in the welfare indeed of any living thing—the conservative principle and the progressive principle.

Any organised living mass—let it be an animal or an organised body of men—by virtue of the conservative principle of heredity, of repetition of like by like, of imitation of action that has proved to be successful, works more economically than it could have done if each individual mass had perforce to work out its own salvation, evolve for itself its own suitability to and temporary mastership of surrounding circumstances.

But the child that can only imitate and repeat the actions of its ancestors brings no positive addition to the excellence of the race the upward progress of which requires to be fed by the costly process of initiative efforts, by the sports of talent and of genius, by the cumulative effect of innumerable hits among innumerable misses of innumerable multitudes of individuals.

Transfer this thought to education—to medical education in particular. An educated person—a competent physician or surgeon—must in the first place learn at the feet of his masters, believe and learn what he is told, imitate what he sees done by his instructors, be the apprentice and follower of the experienced craftsman who shows him tried and approved ways of working.

But the apprentice who is to contribute to the commonwealth of knowledge and power has to be something more than the faithful imitator of his teacher; he must initiate, and he must make a hit among, it may be, his many misses. He will then have contributed to the advancement of knowledge and power.

In all provinces of human activity we may distinguish the result of our two complementary principles—imitation, the conservative principle; initiation, the progressive principle. But while in all provinces the conservative factor, being, so to speak, the means of wholesale economy, bulks the larger, the progressive factor, as the means of retail economy, is relatively insignificant.

Between the two extremes—imitation on the one hand, initiation on the other—there is room for numberless variations; and, by reason of the vastness of area of even the minutest province of human activity, the aim of education, even the most technical, is perforce more and more directed to teach the pupil to use his own mind in presence of the task set him rather than to copy minutely and to reproduce perfectly the model facts shown or described to him by the master.

But in every province, and in particular in that of education, the power of imitation is easier to exert and easier to develop than the power of initiation, which is a rare and costly ingredient, since at any given juncture the odds must be heavily in favour of the success of the time-honoured fact or method as compared with its yet untried competitor.

There are of necessity many misses and few hits among the novelties that come to trial.

The genius of our nation is admittedly a practical genius that looks upon the conservative way as the better way, and makes its changes by as small steps as can be from precedent to precedent. This is the safe and easy way, the way of nature; and to this predominance of fact copied over fancy realised may fairly be ascribed our own prolonged constitutional prosperity. We have found by long experience that it is very long odds indeed against any dark horse without a good pedigree of precedents, so we prefer to back the field; old methods are the safe thing and the good thing.

But one may have too much of a good thing, and in education I think we have had too much of the old methods, in which the keynote is imitation and examination of copy, and too little of that expensive and dangerous ingredient—so dangerous that to some authorities it appears in the light of a poison—initiative and originality of thought. I admit all the danger; I grant to the old authorities that there is a good deal of trash current under

the label of original research. But I do not think we can have wheat without chaff, and I am convinced that the adherents of original research, as against the *clientèle* of the examiner and of the crammer, bring to the educational commonwealth the scanty and much needed ingredient of initiative. We want education still further urged in the direction of teaching the pupil to use his own mind upon unseen translation of new facts into effective conduct, and one of the best ways of obtaining that the teacher shall guide his pupils to use their own minds is that he should himself use his own mind, and not suffer himself to drop into the jog-trot of routine. We want our teachers to be learned men, but we also want them to continue to be learning men; and that is why, in spite of its defects, I want to urge that greater encouragement be given to original research.

I hope I shall not have taxed your patience too far if I bring these considerations to their natural conclusion by telling you as briefly as may be of an effort that is now being made in the University of London to strengthen and organise that spirit of initiative which is, I am convinced, of capital importance in all teaching, the most elementary no less than the most advanced. We have formed ourselves into a school of physiology, including every teacher of physiology in London, each of whom undertakes to give at the headquarters of the University lectures upon those portions of the science with which his own previous study has rendered him specially conversant. The teaching offered is of an advanced character, and is addressed more especially to post-graduate and to Honours students; and, in pursuance of the principle that such teaching is the immediate consequence of learning, the University has provided a research laboratory in which teachers and other post-graduate students find the necessary facilities for work. We believe that the experience of the last five years has sufficiently proved that a "college of learning" thus constituted renders valuable assistance to the teachers and students of the schools of London, and that it is helping to draw to a focus resources and efforts that are at present scattered and wasted among the several schools. I cannot do better in this connection than quote the words of the Chancellor of the University (Lord Rosebery):—"We hope to make this laboratory the central spot for medical research in London... an institute of studies ancillary to medicine, which may develop and complete the work of the University in that direction." And I think that you will agree with me that any movement that contributes to the good health of the University of London contributes to the good health of every university in the Empire, and of every school the teachers of which are animated by the university spirit—the love of learning for its own sake as well as for the sake of the mental and material power that is required of us.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The mastership of Downing College has been offered to Prof. Howard Marsh, who has, it is understood, given a favourable reply, but the election cannot take place until October.

Mr. Augustine Henry has been appointed reader in forestry for five years.

A university lectureship in botany will be vacant at Michaelmas in consequence of the resignation of Mr. Hill. The annual value of the post is 100*l*. Applications for the lectureship, accompanied by testimonials, should be sent to the Vice-Chancellor on or before October 11.

LONDON.—Dr. E. A. Westermarck has been appointed to one of the two professorships of sociology founded by Mr. Martin White—the one for five years; the appointment to the permanent professorship has not yet been made.

Dr. A. C. Haddon, F.R.S., has been appointed university lecturer in ethnology for the session 1907-8 under the Martin White benefaction. The teaching in these sub-

jects will continue to be given at the London School of Economics, and the courses will be treated as inter-collegiate courses.

MANCHESTER.—Mr. J. L. Simonsen, Schunck research fellow, has been appointed a junior demonstrator in chemistry.

OXFORD.—The professor of human anatomy has notified the Vice-Chancellor that the Welsh prize, 1907, has been awarded to Mr. Wathen E. Waller, of University College.

An election to the Philip Walker studentship in pathology will take place in October next. The studentship, which is of the annual value of 200*l.*, is tenable for three years, is open to either sex, and the holder need not necessarily be a member of the University of Oxford nor be legally qualified to practise the profession of medicine, but while holding the studentship he or she must be devoted to original pathological research. If the work done by a student be of exceptional promise, the studentship may be extended for a second period not exceeding two years. Applications, accompanied by three testimonials, must reach the registrar of the University by September 14 next.

At the Convocation to be held on September 30 it will be proposed to confer the honorary degree of D.Sc. upon Dr. Ludwig Mond, F.R.S., who was unable to be present and receive the degree at the late *Encaenia*.

Prof. W. Baldwin Spencer, F.R.S., the holder of the chair of biology in the University of Melbourne, has been elected to an honorary fellowship at Exeter College.

Dr. NORMAN MOORE will deliver the first Finlayson lecture in Glasgow in February next. The lectureship was founded in commemoration of the late Dr. James Finlayson. The subject and actual date of the lecture will be announced later.

Mr. W. ERLAM SMITH, who is at present acting as temporary professor of natural science at Government College, Rangoon, has been appointed to succeed Dr. W. H. Wilson as professor of chemistry in the Presidency College, Madras, when the latter retires in October next.

For work carried on in the cancer research laboratories of the Middlesex Hospital, the Walter Emden research scholarship and the Richard Hollins scholarship have been awarded respectively to Dr. Victor Bonney and Mr. L. Courtauld.

The Joule studentship of the Royal Society has been awarded to Dr. T. H. Laby, of the University of Sydney, now of the Cavendish Laboratory, Cambridge, for the investigation of the conditions of condensation and super-saturation of vapours other than steam.

Mr. RICHARD HENRY CURTIS, principal assistant in the observatories branch, has been appointed superintendent of the instruments branch at the Meteorological Office. The observatories branch will in future be incorporated with the instruments branch. Mr. Richard Corless, of Sidney Sussex College, Cambridge, has been appointed special assistant to the director.

A FELLOWSHIP in agriculture has been awarded to Mr. W. Dawson by the executive committee of the Carnegie trust for his thesis entitled "Production of Seed by Forest Trees," and a scholarship in agriculture has been awarded by the same committee to Mr. F. S. Marr for his paper on "The Stimulus of Phosphoric Acid on the Early Development of Plant Growth."

The following appointments have been made in connection with the Rothamsted Experimental Station:—Dr. E. J. Russell, lately of the South-Eastern Agricultural College, Wye, as the Goldsmiths' Company's assistant for the investigation of soils, and Dr. H. B. Hutchinson, of the Midland Agricultural and Dairy College, Kingston, Derby, as bacteriologist.

Mr. MURRAY has published at 5*s.* net a handsome memorial volume of the visit in June, 1906, to the Uni-

versity of London of representatives of the University of France, the Collège de France, and the French provincial universities. We published in our issue of June 14, 1906, an article on the visit, so do not need to say more about the volume than that it contains the names and particulars as to the standing of the guests, verbatim reports of the various addresses delivered, and accounts of the numerous receptions, luncheons, &c., arranged in honour of the distinguished visitors, concluding with the *conversazione* held at the University of London, South Kensington, at which about 2000 guests were present.

The council of the Institution of Civil Engineers is prepared to consider applications for a nomination to a Palmer scholarship. The annual value of the scholarship, which will be vacant at the end of next month, is 40*l.* Sons of civil engineers alone are eligible for nomination, and they must be desirous of matriculating, and subsequently graduating, at the University of Cambridge, and their circumstances must be such as to need the help afforded by the scholarship. Copies of the regulations may be obtained from the secretary of the Institution of Civil Engineers.

The following appointments in universities abroad are notified in *Science*:—Dr. G. L. Streeter, professor of anatomy in the University of Michigan; Dr. J. Heath Bawden, professor of philosophy in the University of Cincinnati; Dr. F. R. Noll, of the Agricultural Academy at Poppelsdorf, professor of botany at Halle; and the following appointments at Syracuse University have been made:—Joseph E. Kirkwood, professor of botany; W. M. Smallwood, professor of comparative anatomy; and George D. Babcock, professor of practical mechanics.

The most recent report of the U.S. Commissioner of Education deals with the year ending June 30, 1905, and has just been published. The growth of facilities for higher instruction as recorded in the report is remarkable. The total value of property possessed by the institutions for higher education increased during the year with which the volume deals by 10,000,000*l.* At the date mentioned the total value reached approximately 103,000,000*l.*, of which 47,000,000*l.* represents endowment funds, the remainder being the value of the material equipment used for instruction purposes. Forty-one institutions have endowment funds of more than 200,000*l.* each. The rate of increase per year in the endowment funds was 41.3 per cent. during the five years 1900–1905. The total income for the year of these institutions for higher education, excluding benefactions, amounted to 8,355,000*l.*, an increase of 289,200*l.* over the preceding year. Of this amount 23.6 per cent. was from endowment funds, 23.6 per cent. from State appropriations, and 6.9 per cent. from Federal appropriations. It is interesting to note that Harvard and Columbia had incomes exceeding 200,000*l.* each, eight other institutions had over 150,000*l.* each, three over 100,000*l.*, and twelve more over 60,000*l.* The total amount of benefactions reported by all institutions during 1904–5 was 3,335,790*l.*, of which 71 per cent. was received by thirty-three institutions which each obtained 20,000*l.* or more. Harvard received gifts amounting to 466,000*l.*, Yale 279,000*l.*, and Columbia 236,000*l.* The total number of men students in these institutions of higher education increased during the year under consideration from 86,006 to 92,161, and of women students from 32,023 to 34,243.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 27.—"On the Velocity of the Kathode Particles emitted by Various Metals under the Influence of Röntgen Rays, and its Bearing on the Theory of Atomic Disintegration." By P. D. INNES.

(1) The velocity of the electrons emitted by lead, silver, zinc, platinum, and gold under the influence of Röntgen rays has been measured, both for soft and hard rays.